

# DATAMATION'S FEATURE INDEX

JANUARY-JUNE, 1964

## JANUARY

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### Computers and the Continent p. 57

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## MARCH

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Four articles highlight general principles and applications of real-time data processing. T. B. Steel describes some of

the standard definitions of real-time and proposes some standards by which it can be identified. Norman J. Ream, in the first of a two-part article, describes eight different levels of complexity in real-time management information systems and some of the principles by which management can decide which is most appropriate for his firm. Walter Bauer and Sheldon Simmons describe a real-time data handling system at the Pacific Missile Range, and Hans Van Gelder describes an on-line stock quotation system.

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## APRIL

### Computers and False Economics p. 26

by Mark Halpern

The author suggests that the early respect for computer time is out of date in the light of the twin facts of diminishing computing costs and rising personnel salaries. He offers three dimensions for which critical values exist to indicate whether the optimization process in a compiler is worth its price. And he stresses the necessity for gathering some statistics to determine a) the number of compilations required, on the average, before a satisfactory object program is produced; b) price paid at each compilation for object program optimization; c) the number of times object programs are executed on the average; and d) the savings through optimization realized at each execution.

### Burroughs D 825 p. 30

by James P. Anderson

A description of the design rationale, system structure, system modules, communications and system controls, interrupt features and software of a computer system designed for military command and control.

### Automated Payload Checkout p. 35

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Describes the use of a small-scale computer to speed up and automate the checkout of a satellite payload.

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### IBM's New System/360 p. 51

Description of the main modules and general features of the system, which offers six upward and downward compatible main frames and 44 I/O devices.

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## DATAMATION'S FEATURE INDEX

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(Part 2)

### MAY

#### Operating Systems

pp. 26-42

An introductory article by T. B. Steel, Jr. describes the evolving function of operating systems since their inception—from the elimination of idle computer time through more sophisticated system control. Benefits and disadvantages of operating systems are discussed. Three additional articles describe the operating systems for the Honeywell 800/1800, the IBM 1410/7010, and the Burroughs B 5000.

#### The AF's Electronic Systems Division

p. 46

by Robert B. Forest

Goals, scope of activity, organization of divisions, and evaluation of a bid are some of the topics discussed in this four-page interview with the chief of the USAF EDP Equipment Office, Col. Edward McCloy.

#### Computing in the Secondary Schools

p. 77

by Fred Gruenberger

The author discusses the role of computers in the high school curriculum. He gives the following reasons for introducing this innovation. a) There is an increasing pace of technology; b) Students at this stage of development are more receptive because of fewer misconceptions about computers; and c) Computers can be used as a teaching device in such areas as mathematics.

### JUNE

#### Design Automation

pp. 25-34

An article by E. H. Warshawsky provides an introduction to the use of computers in complex design problems, discussing advantages, reconciliation of long- and short-term goals, hardware and financing. In a second article, David Holstein describes the automated design of transformers.

#### More Instructions . . . Less Work

p. 34

by Christopher J. Shaw

The author maintains that the number of instructions is an inadequate and misleading measure of programming productivity. He points out the differences in cost for programming in machine-oriented and procedure-oriented languages . . . as well as the relative efficiency of programs coded in the two languages.

#### Conversational Teaching Machine

p. 38

by Wallace Feurzeig

Traces the evolution of a computer-based teaching system—from a simple guessing game to a medical diagnosis. Highlight of the system is the emphasis upon "Socratic" techniques: given a basic vocabulary, the student asks for information, makes tentative diagnoses, and is "prodded" by the computer to take a new tack, investigate additional evidence, etc.

#### Is COBOL Getting Cheaper?

p. 46

by Royden A. Cowan

Report of a study of comparative COBOL compilation costs for medium- and large-scale computers. Evidence indicates a trend toward more COBOL compiling power per dollar for medium-scale machines which is missing in larger computer systems.

#### Program Change Procedures

p. 51

by William A. Stewart and John E. Crnkovich

Description of the organization and procedures for making, documenting and controlling program design changes, with special emphasis on military command and control systems.



## JULY

### Performance Measurement p. 24-30

Two articles highlight the need for measurement in two critical areas: systems and software. Robert L. Patrick classifies installations by their environment, required response and applications, and attempts to ease the task of measuring system performance. Ascher Opler discusses factors that affect software performance, the influence of computer size and modularity, measurable characteristics of compilers, ground rules for testing relative software performance, and separation of software and hardware characteristics.

### The New Programming Language p. 31 by Daniel D. McCracken

Article outlines the origin of NPL, compares it to existing languages, gives features and examples of NPL capabilities, and guesses at its future.

### Testing Real-Time Systems, Part I p. 42 by Robert V. Head

First of two-part article covers development and management of test procedures, including programs, equipment subsystems, and combinations of equipment and software. Identified are characteristics of real-time systems that both fortify the need for preconversion testing and make such testing harder to carry out.

### Evolution of the Programming System p. 51 by Mark Halpern

Paving the way for the creation of a new programming system (see Dec. '64, p. 39), the author challenges the generally-accepted notion of steady progress in their development . . . classifies the compiler as an application (not a programming) language . . . expresses unorthodox conclusions about the direction such evolution should take.

### Non-Linear Programming p. 55 by Robert E. Singer

A primer for programmers and users, this article differentiates between linear and non-linear programming. It covers practicable techniques for NLP, classifying them as analytical, direct search, and gradient search techniques. Also discussed are suggested problem-solving methods with analog computers.

## AUGUST

### Programming Languages p. 24-40

Four articles cover various aspects of FORTRAN and COBOL. W. P. Heising comments on FORTRAN compatibility and what standards can and cannot be accomplished. Henry Oswald presents a FORTRAN language characteristic/compiler comparison matrix of 16 compilers. Stanley M. Naftaly discusses the construction of a COBOL questionnaire which assists a prospective user in evaluating compiler systems. M. D. Fimple, a user, cites his experience in selecting FORTRAN over COBOL for business dp.

### Centralizing Computer Studies p. 41

One topic discussed at the '63 RAND Symposium was the idea of establishing a National Computer Institute. Its possible functions, sources of financial support, and operational staffing were aired and, at the close, about half of the participants favored establishing such an institute.

### Testing Real-Time Systems, Part II p. 54 by Robert V. Head

The conclusion of this two-part article covers the levels of testing, ranging from a simulation of the environment to acceptance testing, with particular emphasis on the application programs.

## SEPTEMBER

### Computing Abroad p. 24-31

Three articles describe industry and user activities in Australia, Japan, and South Africa. An anonymous correspondent says of Australia: "It seems fairly certain that the exciting new concept of time-shared user-on-line information processing will be quickly accepted and the 'number factory' phase bypassed." Joseph C. Berston and Ken Imada report on such difficulties in Japan as the limited market crowded by competing manufacturers, reluctance of industry to invest R & D funds, and offer year-by-year installation figures. Virginia E. Marting describes the market in South Africa, sales activities, and applications, concluding that greater pay-offs are evident in the engineering and mining industry than in business dp.

### The Mechanized Library p. 32 by L. H. Martin

Describes elements of a document storage system that applies photographic media, optical and electronic techniques for library applications. Elements of the system have operated successfully in a laboratory environment but have not been field tested.

### Optical Handling of Checks p. 39 by Walter Dietrich

A pilot system for automatic postal check handling in Germany is designed to handle some 22,000 accounts and a volume of 40,000 documents a day. Author details elements of the optical scanning system which, if successful, would one day handle some two million accounts and three million documents each day.

## OCTOBER

### Digital Simulation and Modelling p. 25 by G. B. Hawthorne, Jr.

Tutorial paper covers examples, techniques and classification of simulations, applicability and feasibility of simulation studies, and advantages and dangers.

### Elections & Computer Projections p. 30 by Dr. Jack Moshman

Covers procedures followed to project election results on the basis of early

returns, within limits posed by the state of the computing art, statistical theory, and the behavioral sciences. Describes selection of key precincts, concepts of the voter model, and base line projections.

### U and the Machine p. 38 by Christopher J. Shaw

A graphic parable on the concept of implicit programming, one of six basic ways of changing the operation of system software to make the system more responsive to a user's changing requirements.

### Computer-Generated Coding p. 59 by James R. Ziegler

BEST, designed for business edp, is a method for generating the detailed coding for program input with an NCR 315. Includes steps in the program production, and sample application.

## NOVEMBER

### Time-Sharing p. 24-54

Four articles on this topic begin with a discussion by E. L. Glaser and F. J. Corbato on the more meaningful aspects of this still-embryonic method of distributing computer capability. Jules I. Schwartz, in the first of his two-part article, describes the SDC time-sharing system; the scenario of a filmed report on the JOSS system at the RAND Corp. is also presented. Edited is a panel discussion on time-sharing held at the '64 national ACM conference in Philadelphia. And finally, a description of one of the latest time-shared computers, the PDP-6 by Digital Equipment Corp.

## DECEMBER

### Information Retrieval p. 24-33

Three articles on I.R. include a discussion by Gary R. Martins on the scant progress experienced by the field, but which has generated many technical papers, and a rundown of current research activities. An application report by Charles J. Austin describes the MEDLARS system at the National Library of Medicine. Joseph Becker reports on a photo-chromic micro-image system by NCR, a high-density document storage medium with high-resolution capabilities.

### XPOP: A Command & Control Programming System p. 39 by Mark Halpern

Description of a meta-language processor which may change the terms of current arguments, pro and con, about the standardization of C & C programming languages.

### The SDC Time-Sharing System — Part 2 p. 54 by Jules I. Schwartz

The concluding installment enumerates service routines available in the system, applications being run, and the future outlook for this mode of operation.

